COMPARISON OF OIL PRODUCE FROM CO-PYROLYSIS AND CATALYTIC CO-PYROLYSIS OF EMPTY FRUIT BUNCH AND WASTE TYRE

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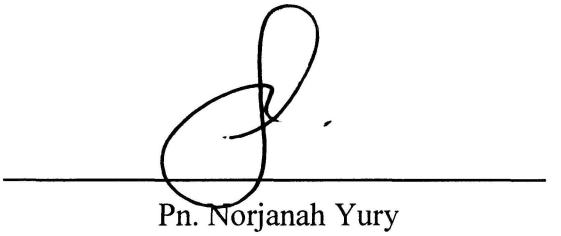
This Final Year Project entitled "Comparison of Oil Produce from Co-pyrolysis and Catalytic Co-pyrolysis of Empty Fruit Bunch and Waste Tyre" was submitted by Nurhayati Zainal Abidin, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by



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ABSTRACT

COMPARISON OF OIL PRODUCE FROM CO-PYROLYSIS AND CATALYTIC CO-PYROLYSIS OF EMPTY FRUIT BUNCH AND WASTE TYRE

Co-pyrolysis was discovered as a new technology to dispose solid waste with valuable yield. The main product that produced from co-pyrolysis is liquid oil, char and gas. In this study the co-pyrolysis process was done to breaking down the molecular structure of these wastes under conditions of moderate pressure and temperature, in order to produce a mixture of hydrocarbons. Co-pyrolysis of oil palm empty fruit bunch (OPEFB) and waste tyre was carried out on a fixed bed reactor at 500°C. Waste tyre and impregnated OPEFB with 10% w/w of cobalt catalyst solution were then pyrolysed in the same reactor at 500°C. The physical properties of the raw sample and condensed oil including, calorific values, proximate analyses and ultimate analyses were determined. The pyrolysis oil was collected in ice cooled collector. The oil yield was found increasing after the addition of cobalt cataylst impregnated into the OPEFB where the increment is about 33.3% of the liquid oil yields from 42.8% to 57.06% where as no significant increment on the residue (char). The properties of the oil were determined by gas chromatography mass sprctrometer (GCMS). Limonene was identified as a major component of the oils, representing 19.10% and 25.96% of peak area at 500°C. Significant quantities of light aromatics such as benzene, xylene and styrene were also found.